

Certification Laboratory Pilot, Accreditation Plan and Interconnection Agreement Handbook

**NREL/DOE
Quarterly Review
DER Interconnection**

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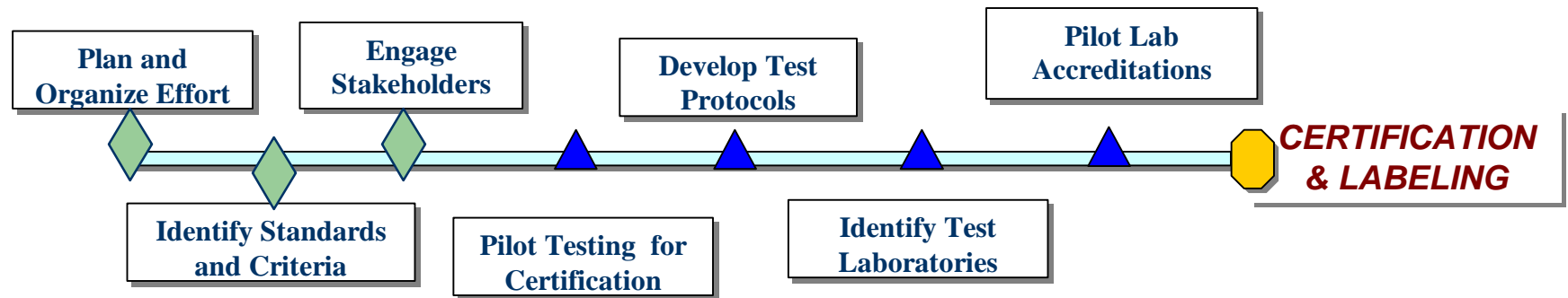
Project Overview

- Scope of Work:
 - 3rd party certification and lab accreditation pilot efforts applying lessons-learned and demonstrating feasibility.
 - Interconnection agreement handbook and support tools including future web based, library, training and hotline
- Base-year Tasks were:
 - Plan and roadmap for certification criteria and labeling
 - Solicit stakeholders participation, outline handbook efforts and develop communication site
- Option-year 1 Tasks are to:
 - Develop test protocols and run pilot tests
 - Produce handbook on interconnection agreements



Industry-Government Collaboration to achieve DER Certification and Labeling

- Planned path to certification and labeling



- Progress down this path will draw on many parallel activities such as DOE DPP interconnection research, EPRI “completing the circuit” testing, IEEE 1547 Interconnection and UL 1741 Standards
- Activity on IEEE Certification project resuming this fall is expected to promote more industry interest



Project Significance

- Focuses efforts on a path to DER certification thus helping to coalesce many independent and necessary activities.
- Promotes the use of latest research results in writing criteria, best practices, and standards, which can significantly reduce development time as in other new technology areas PV, PQ and Utility Communication Architecture.
- Links hands-on testing with criteria development and rule making to enhance technical results and credibility



Project Approach: Build on Existing Experience

- DR certification will build on existing power industry, national and international standards, e.g.
 - IEEE “Standards” for terminology, functions, control, specification and performance of power generation
 - DOE-NREL Handbook and Criteria for Certification and Laboratory Accreditation of PV (NREL/TP-412-7680 and 21291)
 - UL 1741 Standard for Safety in Power Systems
 - Electrical Generating Systems Association Guide Specs and Performance Standards
 - NFPA, NEMA and CSA Documents related to power systems



DR Certification & Accreditation Base-Year Contract Deliverables

#	Description	Status
B-1	DG Certification Web-based Resource Beta Site	Completed
B-2	Draft Certification and Accreditation Plan	Completed
B-3	Outline Plan for Interconnection Handbook	Completed
B-4	Annual Technical Status Report	In progress



Current Status

- Completing Annual Technical Progress Report which Includes:
 - How to create C&A infrastructure
 - Stakeholder input on required tests
 - Next steps and Road Map Plan
 - Outline of Agreement Handbook, Overview on available agreements and Generic Criteria for Test Requirements (DER-1)
- Maintaining Web Site for Stakeholders



Scope of Planned Certification Documents (DER1 thru DER3)

- Scope of DER1 – Description of C/A documents, general test and evaluation criteria, technical criteria, and describes future application-specific protocols for testing and labeling for certifiers.
- Scope of DER2 – Third-party certification and labeling plan and roadmap, and operational procedures for the certification body from DER stakeholders.
- Scope of DER3 – Quality system for accredited laboratory application, application and certification procedures for use by manufacturers.



Established a web-site for stakeholders communications

- Web-based Information Resource
 - Project milestone chart, plans, deliverables
 - Library for connection
 - Tools for connection
 - Summary of other interconnection activities
- Communication links to interconnection information
- Information transfer area for stakeholders participating in certification and accreditation efforts
- URL “derConnections.com” (a working area on www.EPRI-PEAC.com website)



Access via..... www.EPRI-PEAC.com


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— New in PQ —


Power Quality

Distributed Generation

Transmission & Distribution

ADVANTAGE Program

For nearly a decade, EPRI PEAC has used its proprietary Process Ride-Through Evaluation System, also known as the Porto-



diagnose and solve power problems at customer day, a 200-amp model is to broaden the on of the Porto-Sag to industrial

Introduction
Studies and Research
Testing: PQDG Park
Monitoring
DER Certification
Project Opportunities
Training

— Advantage News —

EPRI PEAC announces the inauguration of its 'Advantage' program, a suite of six complementary services to meet the needs of our clients in a growing digital economy. The goal of the program is to improve the use and quality of electric power.

— PQ Tools —

Power Factor Calculator
Tutorials
Case Studies
Puzzlers

— In Touch —

Mailing List
Submit a PQ Puzzler
Submit a Case Study

— Take Our Survey —

In your opinion, what is the most common type of power quality problem?

☐ Harmonics
☐ Voltage Sags
☐ Transients
☐ Wiring/Grounding Issues
☐ EMI/EMF Interference

Submit


PQ Puzzler

How can an increase in a residential load cause lights to get brighter? Read this month's PQ Puzzler and submit your answer.

Puzzler

The Revelations of Failure Analysis

When equipment fails, knowing what caused the



http://www.epri-peac.com/dr_certification_site/index.html Internet

Stakeholder Participation Report

- DER Manufactures, Government, Utilities, and End-Users invited to participate
- 34 potential participants contacted
 - Direct contact at IEEE 1547 meeting November 2001
 - Letters sent January 24, 2002
- 10 have committed to work on the project as of March 2002
- Additional participation is expected when the IEEE SCC-21 Certification efforts resume



Coordination Efforts are not only Technical Standards

- Areas that need to be considered
 - State and federal regulatory actions
 - Economics, costs vs benefits
 - Availability of practical interconnection hardware
 - Quality, availability, and reliability
 - Education and Training
- Organizations with Related Activities
 - Department of Energy, DPP interconnection projects
 - California Energy Commission PIER
 - New York, Texas, California and other states rules
 - EPRI and Utility Industry Interconnection Research
 - Other Private and Public Activities Research



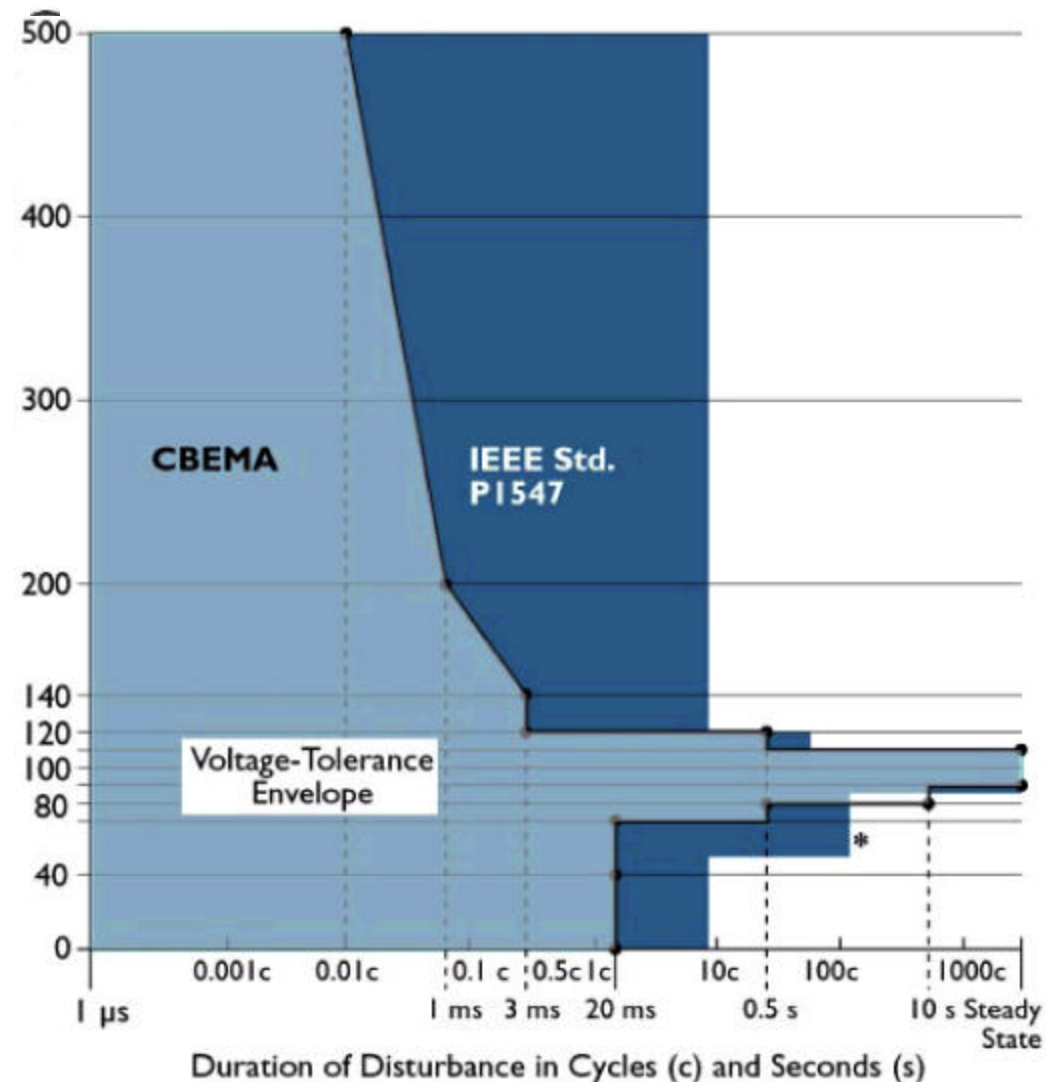
Preview of Year 2: Pilot Testing of DER Certification Regiment

- Objective – pilot typical units thru a certification regiment, set-up lab procedures and involve DER manufacturers.
- Scope – evaluate three inter-connection types, inverter, induction and synchronous machines, create “strawman” test protocols and develop criteria for certification
- Schedule – January 2002 thru March 2003



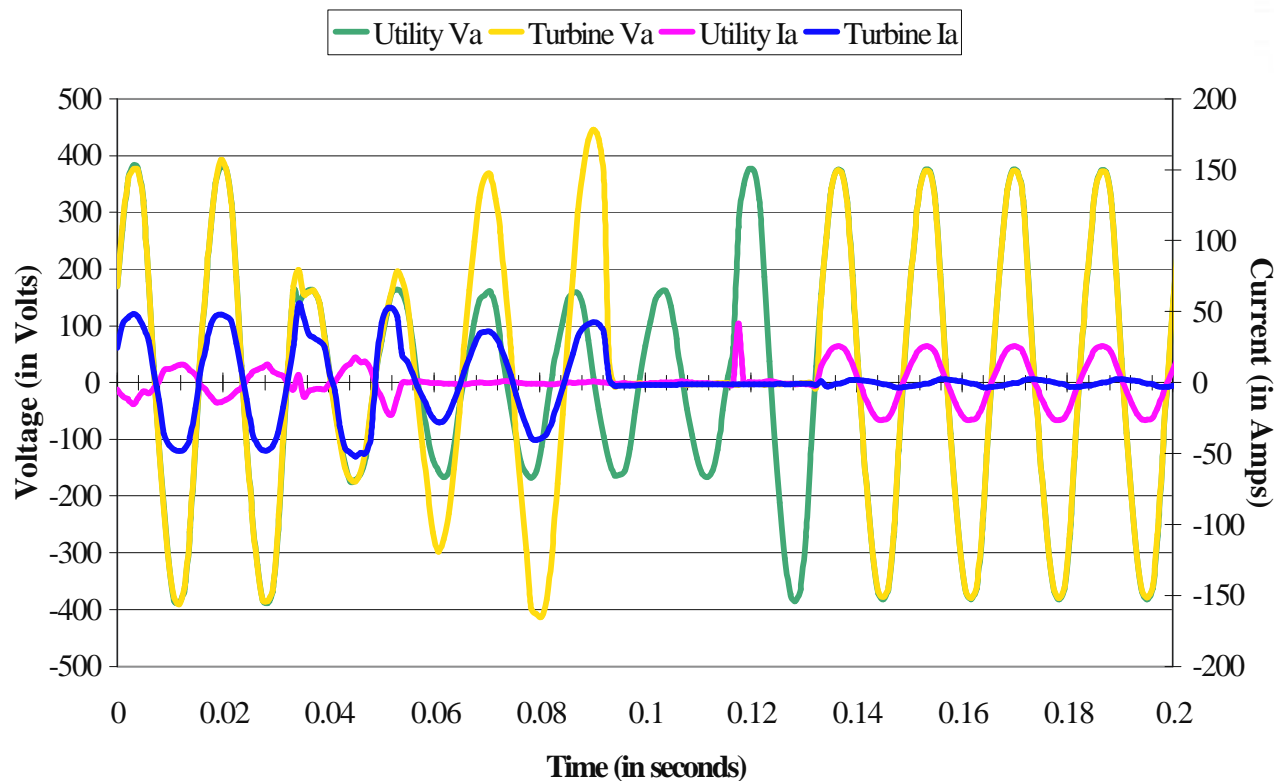
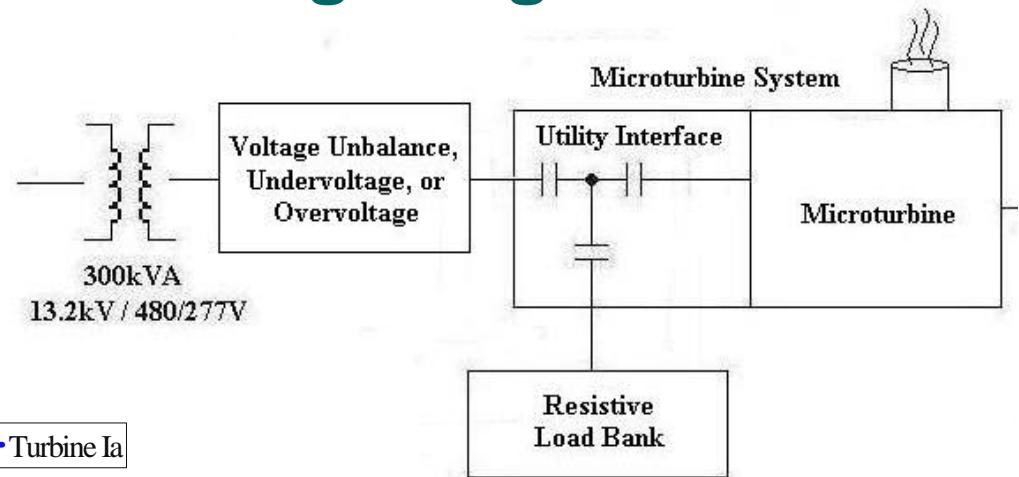
Pilot tests results compare DER Inter-connection Performance to Standards

- (1) characterize the response of an MTG to voltage sags
- (2) determine how this response compares to the voltage operating limits specified in voltage standards:
 - IEEE P1547
 - American National Standards Institute (ANSI) C84.1,
 - IEEE 1100, and CBEMA immunity or voltage tolerance criterion

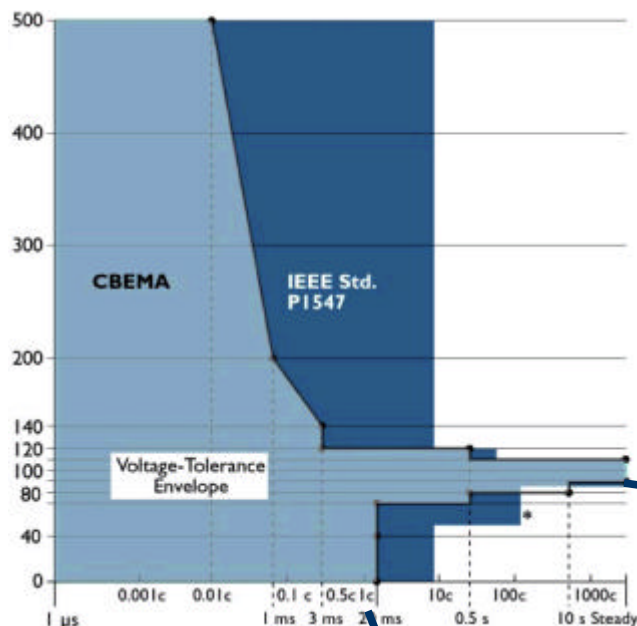


Response to Abnormal Utility: Voltage Disturbances – Voltage Sags

- Applied three-phase voltage sag to 40% of nominal for 5 Cycles



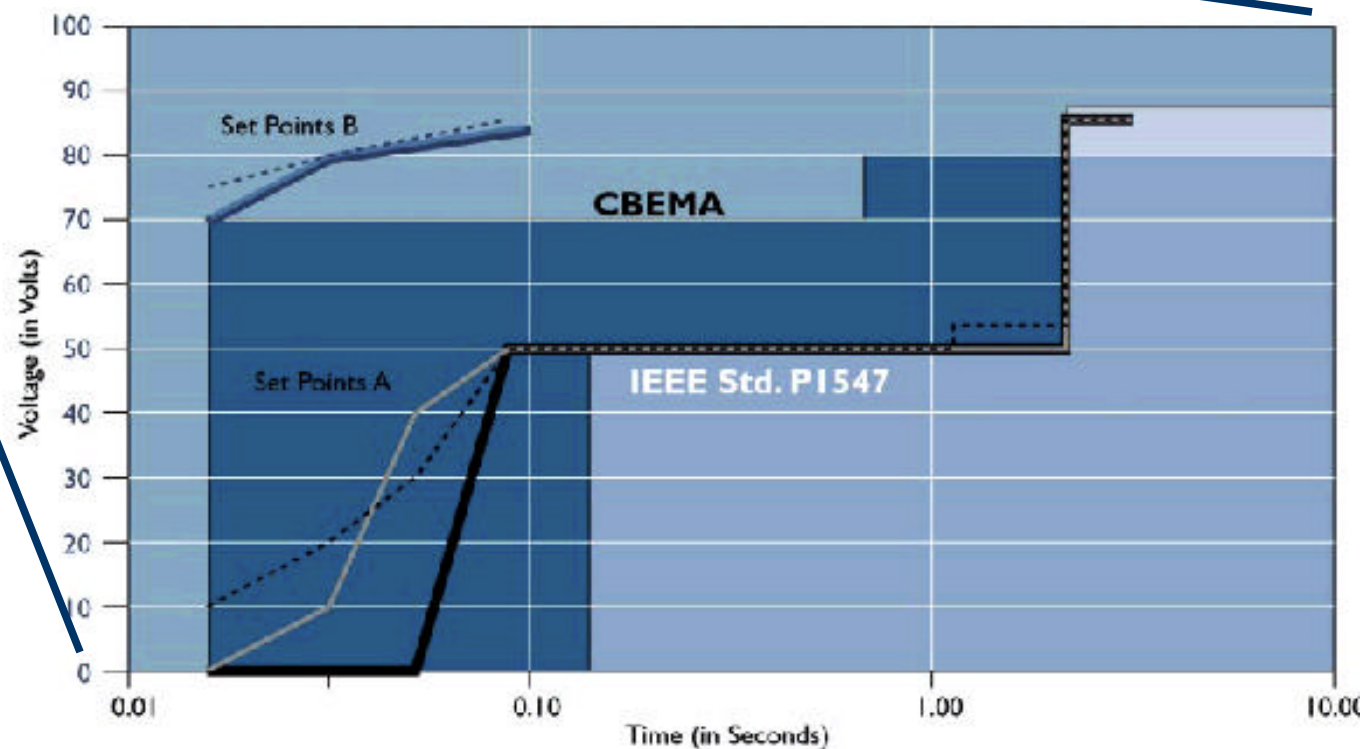
- DER trips off at utility PCC in less than 2 cycles, drops load in 3.5 cycles, and transfers load to utility in 6 cycles.



- DER unit set-up offered two options, set points, A and B.

Type	Set Points	Set Points A	Set Points B
Undervoltage Level 1	424.0V (88%)	2.0 sec. Delay	0.01 sec. Delay
Undervoltage Level 2	240.0V (50%)	0.01 sec (Factory Fixed)	0.01sec (Factory Fixed)

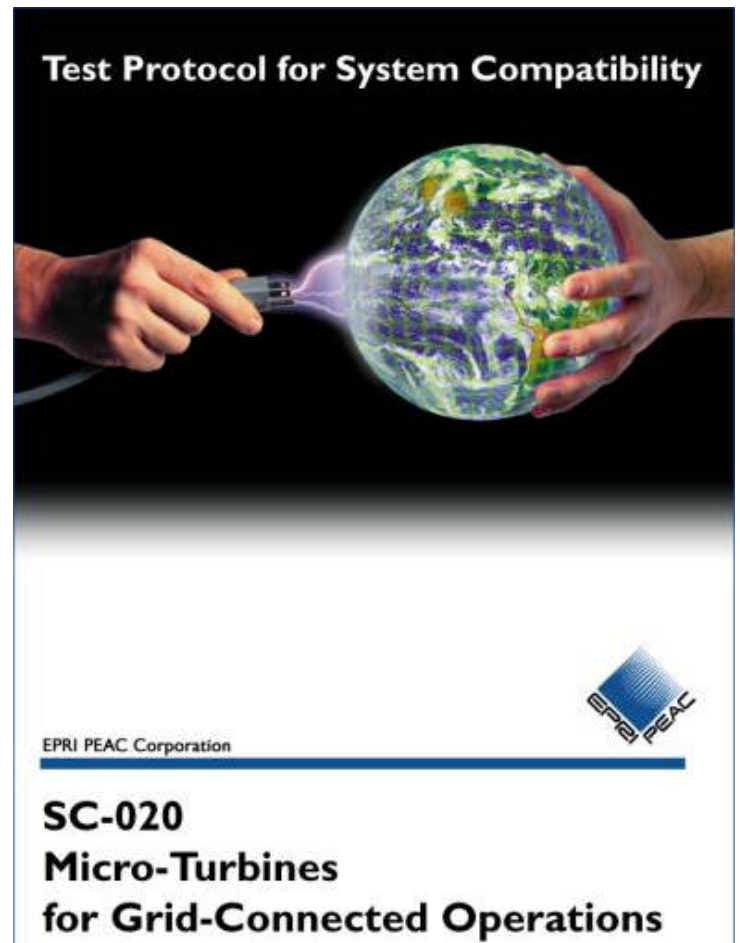
- Duration for P1547 points is equated to “clearing time.”
- Different lines in each set represent single, two phase, and three phase events.



Application-specific test protocols

Required Steps

- Define baseline for electrical environment
- Develop performance criteria and test methods
- Test DER equipment with utility and equipment manufacturer participating
- Develop certification protocols for DER



Update on DER Manufacturers and Equipment for Pilot Certification

Distributed Generators

- Ingersoll-Rand Power Works 70kW
- Elliott Energy Systems TA-80
- Turbec Americas T-100
- SMT 25-kW Sterling Engine
- CAT 250-kW natural gas EG

Interconnection Hardware

- Beckwith M-3410 Intertie
- Basler BE1-951
- Schweitzer SEL 547 Intertie
- Encorp enPower GPC



Distributed Generator Compliance Evaluation Tester – 75 kW

Tester enables mobile testing of distributed energy resources to determine compliance of IEEE standard 1547, *Draft Standard for Interconnecting Distributed Resources with Electric Power Systems*.



Collaborative Initiative Leading to “Certified Grid Compatible”

